Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (currently amended): A rostering computing system based upon genetic algorithms, said rostering computing system comprising:

at least one computer readable storage medium within which embedded a computer program code for performing rostering; wherein the computer program code comprises:

a workload and shift setting optimizer for constructing an initial shift list matrix, wherein the shift list matrix has m rows and n columns, wherein m and n are integral numbers, and when m represents a plurality of staff, n represents a plurality of shifts during a rostering period;

and

a rostering engine~~, coupled to said at least one storage medium, said rostering engine being adapted to perform~~ for performing genetic algorithm evolution on ~~an~~ said initial shift list matrix ~~having one or more shift lists~~ to firstly ~~thereby~~ derive a ~~n~~ roster and then further fine-tune said roster, said genetic algorithm evolution being based upon dynamic adjusting factors, each of said dynamic adjusting factors being respectively associated with each of said shift lists.

Claim 2 (currently amended): The rostering computing system of Claim 1, wherein said dynamic adjusting factors comprises a shifting factor; ~~said shifting factor being associated with each of said shift lists and based upon a predetermined time period;~~ wherein the shifting factor does not directly represents roster solution element but dynamically represents how the shifting position from which shifting operation is performed by GA evolution on said initial shift.

Claim 3 (currently amended): The rostering computing system of Claim 2, wherein said rostering engine performs said genetic algorithm evolution on said initial shift lists to derive a roster by ~~is further adapted to~~ dynamically ~~shift~~ shifting said shift lists in at least one evolutionary cycle based upon said shifting factors as genes in a chromosome ~~during said genetic algorithm evolution~~.

Claim 4 (currently amended): The rostering computing system of Claim 2, wherein said dynamic adjusting factors further comprises a swapping factor, said swapping factor being associated with each of said shift lists.

Claim 5 (currently amended): The rostering computing system of Claim 4, wherein said swapping factor comprises a gene group having two genes, each of said gene being associated with a ~~n individual shift~~ swapping position within each of said shift lists, and two genes in said gene group determine two swapping positions in the associated shift list, two shifts located at said two swapping positions are to be swapped in said GA evolution in order to fine-tune the roster generated in prior evolutionary cycles.

Claim 6 (currently amended): The rostering computing system of Claim 5, wherein said rostering engine ~~is further adapted~~ performs said genetic algorithm evolution to fine-tune the roster previously searched by using swapping factors to swap individual shifts ~~of said gene group~~ for each of said shift lists, said GA based fine-tuning evolution can be optionally performed for more than one times until an optimal or a near-optimal roster solution is obtained, or terminating condition is met.

Claim 7 (currently amended): The rostering computing system of Claim 1, ~~wherein said rostering system further comprises a workload and shift setting optimizer for constructing said initial shift list matrix.~~ wherein the plurality of shifts include working shifts and non-working shifts.

Claim 8 (currently amended): In a rostering computing system based upon genetic algorithms, a method for processing user input information to derive a roster associated with one or more individuals, said method comprising the steps of:

~~initializing~~ constructing an initial shift list matrix, said initial shift list matrix having one or more shift lists respectively associated with said one or more individuals;

and

performing genetic algorithm evolutions in two separate phases (phase I and phase II) to derive a roster in the phase I and to fine-tune the phase I roster in the phase II ~~of said initial shift list matrix based upon~~ using dynamic adjusting factors as genes in a chromosome, each of said dynamic adjusting factors being respectively associated with each of said shift lists.

Claim 9 (currently amended): The method of Claim 8, wherein said genetic algorithm evolution in the phase I ~~performing step~~ comprises the step of dynamically shifting said initial shift lists to form a plurality of shift list matrices in at least one evolutionary cycle based upon a shifting factor of said dynamic adjusting factors.

Claim 10 (currently amended): The method of Claim 9, wherein said performing step further comprises the step of calculating fitness value for each of said plurality of shift list matrices; said fitness value is a measurement of shift balance and constraint satisfaction of each of said shift list matrices constructed based upon chromosomes produced in GA evolution.

Claim 11 (currently amended): The method of Claim 10, wherein said genetic algorithm evolution in the phase I by dynamically shifting said initial shift lists generates a roster solution which is created by the best chromosome among others at end of the GA evolution cycle according to their fitness evaluation ~~performing step further comprises the step of selecting from said plurality of shift list matrices to construct a mating pool based upon said fitness value~~.

Claim 12 (currently amended): The method of Claim ~~11~~ 8, wherein said genetic algorithm evolution in the phase II may be performed for one or more rounds ~~performing step further comprises the step of~~ by swapping between individual shifts identified by a gene group for one or more of said shift lists, said gene group having two or more genes, each of said genes being associated with an individual shift within each of said shift lists.

Claim 13 (currently amended): A product comprising computer ~~usable~~ storage medium having a computer program recorded thereon for processing user input information to derive a roster associated with one or more individuals, wherein said ~~product~~ computer program ~~comprising~~ comprises :

a workload and shift setting optimizer ~~computer program code means~~ for constructing ~~initializing~~ an initial shift list matrix, said initial shift list matrix having one or more shift lists respectively associated with said one or more individuals;

and

a genetic algorithm-based computer program ~~code means~~ for performing genetic algorithm evolution of said initial shift list matrix based upon dynamic adjusting factors, each of said dynamic adjusting factors being respectively associated with each of said shift lists;

Claim 14 (currently amended): The product of Claim 13, wherein said genetic algorithm-based computer program ~~code means for performing~~ comprises a main roster scheduler program ~~computer program code means~~ for dynamically shifting said shift lists to form a plurality of shift list matrices in at least one evolutionary cycle based upon a shifting factor of said dynamic adjusting factors.

Claim 15 (currently amended): The product of Claim 14, wherein said genetic algorithm-based computer program ~~for performing~~ further comprises a fitness function

computer program module ~~code means~~ for calculating fitness value for each of said plurality of shift list matrices.

Claim 16 (currently amended): The product of Claim ~~15~~ 14, wherein said ~~computer program code means~~ main roster scheduler program performs genetic algorithm evolution in the phase I by dynamically shifting said initial shift lists generates a roster which is created by the best chromosome among others at end of the GA evolution cycle according to their fitness evaluation. ~~for performing further comprises computer program code means for selecting from said plurality of shift list matrices to construct a mating pool based upon said fitness value.~~

Claim 17 (currently amended): The product of Claim ~~16~~ 13, wherein said genetic algorithm-based computer program ~~code means for performing~~ further comprises a roster fine-tuning program ~~further comprises computer program code means~~ for swapping between individual shifts identified by a gene group for one or more of said shift lists, said gene group having two or more genes, each of said genes being associated with an individual shift within each of said shift lists, said fine-tuning program improves quality of the roster generated in the phase I and achieves a higher level of shift balance and constraint satisfaction of the roster solution.